CLAIMS

1. A method of validating the connection of a multi-wired cable between first and second electrical components, the method comprising:

generating a pre-specified voltage level when the first component is properly connected to the second component through the cable and at least the first component is powered up;

testing for the existence of the pre-specified voltage level on each of the components; and

asserting an error signal on any component if that component does not detect the pre-specified voltage level.

2. The method according to claim 1, wherein:

the first and second components transmit signals carried by the cable to other electrical components; and

at least one of the first and second components inhibits the transmission of at least one such signal if the error signal on the at least one component is asserted.

3. The method according to claim 1, wherein the first component and the second component must be powered up in order to generate the pre-specified voltage level.

4. The method according to claim 1, wherein the generation of the pre-specified voltage level includes:

applying power to a voltage divider in the first component and supplying the output of the voltage divider at a terminal of the first component;

connecting the first component terminal with a terminal in the second component via a wire in the cable; and

providing a circuit element connected to the second component terminal in order to modify the output of the voltage divider and yield the pre-specified voltage level.

5. The method according to claim 4, including means for short circuiting the circuit element in the second component in the event the second component is not powered up.

6. The method according to claim 4, wherein the voltage divider comprises two resistors connected in series and the circuit element is a third resistor that connects in parallel with one of the first and second resistors when the cable is properly connected between the first and second components.

7. The method according to claim 6, including a diode connected between the third resistor and a power supply in the second component for short circuiting said parallel connection of the third resistor and one of the first and second resistors in the event the second component is not powered up.

8. The method according to claim 7, wherein testing for the pre-specified voltage level includes:

testing to determine if the voltage at the first component terminal falls within a pre-determined voltage range; and

testing to determine if the voltage at the second component terminal falls within the pre-determined voltage range.

9. The method according to claim 4, further comprising:

detecting on the first component the state of a pre-determined signal which is intended to be received from the second component via the cable and which is normally at a non-zero voltage level; and

asserting the error signal on the first component if it does not detect the pre-determined signal to have a non-zero voltage level.

10. The method according to claim 9, wherein the intended signal is a normally high reset signal which is:

unasserted when the second component is powered up and operating normally.

11. The method according to claim 9, wherein the voltage divider comprises two resistors connected in series and the circuit element is a third resistor that connects in parallel with one of the first and second resistors when the cable is properly connected between the first and second components.

12. The method according to claim 9, wherein:

the first and second components transmit signals carried by the cable to other components; and

at least one of the first and second components inhibits the transmission of at least one such signal if the error signal on the at least one component is asserted.

13. The method according to claim 9, wherein each component detects the amount of current flowing in the reset signal and asserts the corresponding error signal when said current flow exceeds a pre-specified value.

14. The method according to claim 9, wherein the components are elements of a programmable logic control system, the second component being a processing module and the first component being an adapter.

15. Apparatus for confirming that a multi-wired cable is validly connected between first and second electrical components, the apparatus comprising:

a voltage divider connected to a power supply in the first component, wherein the voltage divider comprises two resistors connected in series and having a common node thereof connected to a terminal of the first component;

a third resistor in the second component connected to a terminal thereof so as to be disposed in parallel with one of the two resistors and yield a pre-specified voltage at

the output of the voltage divider when the cable is properly connected between the first and second components;

circuitry connected to the first component terminal in order to test for the presence of the pre-specified voltage and assert an error signal in the absence thereof; and

circuitry connected to the second component terminal in order to test for the presence of the pre-specified voltage and assert an error signal in the absence thereof.

16. The apparatus according to claim 15, including a diode connected between the third resistor and a power supply in the second component for short circuiting said parallel connection of the third resistor and one of the first and second resistors in the event the second component is not powered up.

17. The apparatus according to claim 16, wherein the testing circuitry on each electrical component comprises a window comparator for determining if the voltage at the corresponding terminal falls within a pre-determined voltage range.

18. The apparatus according to claim 15, further comprising circuitry for detecting on the first component the state of a reset signal which is intended to be received from the second component via the cable and for asserting the error signal on the first component if the reset signal is not in a non-zero unasserted state.

19. The apparatus according to claim 18, wherein the first and second components transmit signals carried by the cable to other electrical components, and including circuitry for enabling at least one of the first and second components to inhibit the transmission of at least one such signal in the event the error signal on the at least one of the first and second components is asserted.

20. The apparatus according to claim 19, wherein each component detects the amount of current flowing in the reset signal and asserts the error signal associated with the component when said current flow exceeds a pre-specified value.

21. A programmable logic control (PLC) system comprising:

a processor having a built-in power supply;

a local group of I/O modules;

a system bus for enabling the processor to communicate with the local group of I/O modules, the local group receiving power from the processor via a dedicated line on the system bus;

an adapter having a built-in power supply;

a first cable for extending the system bus from the processor to the adapter, wherein the dedicated line is used to electrically connect a terminal on the processor with a terminal on the adapter;

a remote group of I/O modules communicating with the adapter via the system bus, the remote group receiving power from the adapter via the dedicated line on the system bus;

a voltage divider connected to the power supply of one of the pair of the processor and the adapter, the voltage divider comprising two resistors connected in series and having a common node thereof connected to the terminal of the one of said pair;

a third resistor disposed in the other of said pair and connected to a terminal thereof so as to be disposed in parallel with one of the two resistors and yield a pre-specified voltage at the output of the voltage divider when the terminals of the processor and adapter are connected;

circuitry disposed on the one of said pair for detecting the pre-specified voltage and for asserting an error signal in the absence thereof; and

circuitry disposed on the other of said pair for detecting the pre-specified voltage and for asserting an error signal in the absence thereof.

22. The PLC system according to claim 21, wherein a second cable, identical to the first cable, is used to split the local group or the remote group of I/O modules.

23. The PLC system according to claim 21, wherein the testing circuitry includes a window comparator for determining if the voltage at the corresponding terminal falls within a pre-determined voltage range.

24. The PLC system according to claim 21, including a diode connected between the third resistor and a power supply in the other of said pair for short circuiting said parallel connection of the third resistor and one of the first and second resistors in the event the other of said electrical component pair is not powered up.

25. The PLC system according to claim 21, wherein the one of said pair is the adapter and the other of said pair is the processor, and further comprising circuitry for detecting on the adapter the state of a reset signal which is intended to be received from the processor via the first cable and for asserting the error signal on the adapter if the reset signal is not in a non-zero unasserted state.

26. The PLC system according to claim 25, including circuitry for enabling at least one of the processor and the adapter to inhibit the transmission of pre-specified bus signals in the event the error signal on the at least one of the processor and the adapter is asserted.

27. The PLC system according to claim 21, wherein the processor and the adapter each detect the amount of current flowing in the reset signal and assert the corresponding error signal in the event the current flow exceeds a pre-specified value.